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IV. *An Account of some Magnetical Experiments and Observations.* By W. Derham, Rector of Upminster in Essex, and F. R. S.

HAVING lately invented an *Azimuth-Compass*, as I was preparing it for observing the *Magnetick Variation*, I took occasion, in some leisure hours, to try divers Magnetick Experiments for my diversion; and by that means happened upon this odd *Phenomenon*.

Having touched a piece of Wire, so that it strongly tended N. and S., I was minded to see whether it would have any Inclination to either of the Poles of the World, when turned round like a Ring, so that the two ends of the Wire met. And having again straitened it, I was surprized to find it had quite lost its *Verticity*. The cause of which I presently concluded to be the Contact of the Northern and Southern ends of the Wire, which I thought might so influence one the other, as to confuse its Poles; although I confess I had never observed any such Confusion to arise upon the bare contact of the Northern and Southern ends of two other touched pieces of Wire.

Upon this I touched strongly the same, and other pieces of fresh Iron Wire, and having found them all greedily to turn N. and S. I coyled them round so as that the ends should not come near one another, and again speedily opened them strait; and found, as before, that every piece had utterly lost its *Verticity*: Nay, the *Magnetick Virtue* was so absolutely destroyed by bending the Wire, that it had not only lost its Inclination to either Pole, but the two ends of each Wire seemed indifferent to the Poles of the

Load-

Loadstone. viz. whereas before the bending, the adverse Poles of the *Loadstone* would repel, and the Similar Poles attract the adverse, or Similar ends of the Wire: Now the repulsive Virtue was quite extinguished, and either end would indifferently be attracted by either Pole of the Magnet; all one as if the Wire had been heated red hot (which is well known to destroy the Virtue) or never had been touched at all.

This I experimented over and over again upon Wires of different lengths, with the same success. Only this must be observed, if you only bend the Wire round, so as that it shall spring back into its place, or recoil, so as to be near the same straitness, that then no such, or but little of such effect, will ensue. But to produce this effect, the Wire must be *sharply* bent, so as that *violence* may be exerted upon it. If it be coyled two or three times round a small round Stick, it will best succeed. And farther also, it is necessary that every part of the Wire should be bent, to evacuate the Magnetick Virtue: For if the ends, or any other part happen not to suffer the violence of bending, that part shall retain its Magnetism. As for instance, if the Wire be all coyled, except half an inch, or indeed half a tenth of an inch at each end, every part so coyled shall both lose its Verticity, and shall incline indifferently to either Pole of the Magnet; but the two ends, (although not able to turn the whole Wire N. and S.) shall fly from, or tend unto the respective Pole of the Magnet: Or if every part of the Wire be coyled, except a small bit at one end only, all that coyled part, when extended, shall utterly be deprived of its Magnetism as before; and only that uncoyled bit retain its aversion, or inclination to the Magnetick Poles.

From the consideration of all which particulars, it is very manifest, that the violence exerted upon the Wire by bending doth utterly extirpate the Magnetick Virtue, or at least make such a confusion therein, that it is as if wholly destroyed

ed : Which being a case so very odd, and never (that I have ever met with) taken notice of before, I have thought it a part of my Duty I owe to this ingenious and learned Society, to acquaint you with it ; hoping it may give some lucky hint to some Ingenious Person, for the better discovery of that intricate Subject, concerning the Nature of Magnetick Bodies.

VII. *Farther Observations and Remarks on the same Subject.*

I Lately gave the Society an account of the *Destruction of the Magnetick Virtue* in a touched piece of Iron Wire, by *Bending, or Coyling round* : Which I thought had been a Novelty. But by looking over more accurately what others have written of Magneticks, I find in *Grimaldi de Lumine and Colore*, that he, and in our *Phil. Transactions*, N. 188, that *Mr de la Hire* had hit upon the same discovery before me. However, they having not prosecuted their Discovery so far as I did, and my account containing divers things not taken notice of by them, I hope what I sent the Society was not unacceptable.

And indeed it is very happy for me that I have the Authority of so Ingenious Persons on my side, because the Experiment not succeeding in some tryals since, I have had reason to fear lest the Society might call my Integrity in question.

The matter of fact was thus, and to me surprizing : I touched and coyled several Iron Wires, but the effect that ensued was not such as I told the Society. The Verticity was indeed much weakened, but not totally destroyed, and the ends of the Wires would be attracted or repelled by